Pennsylvania Summer Reliability

MET-ED

A. Reliability Enhancement Programs

Metropolitan Edison Company ("Met-Ed" or "Company") remains committed to providing safe and reliable electric service to its customers and employs various programs to strengthen the durability and flexibility of the electric system. The Company has put into place plans, which are described in various filings, to further support reliability performance. These filings include a Reliability Plan,[1] Worst Performing Circuit ("WPC") Plan,[2] and the Long-Term Infrastructure Improvement Plan ("LTIIP").[3] Components of these plans are described below.

In addition to the cycle based tree trimming that Met-Ed performs, the Company plans to perform additional tree trimming to remove overhanging trees and clear cross country rights-of-way on portions of the circuit. This will help reduce the potential for future outages. Met-Ed plans to perform additional tree trimming on approximately 303 miles on sixteen circuits in 2017.

To ensure the adequate protection of circuits and ultimately minimize outage frequency and duration by reducing the scope of large outages, Met-Ed installs fuses on unprotected segments of its distribution circuits. In 2016, Met-Ed installed 1,181 fuses and plans to install 432 fuses in 2017.

To address customers served by radial circuits, Met-Ed plans to build distribution ties and loops between radial sections of its circuits. This allows for circuit switching during outages and enables faster service restoration for customers. In 2016, Met-Ed installed one circuit tie and loop and plans to install three circuit ties and one circuit loop in 2017.

To strengthen its electrical system, Met-Ed conducts targeted circuit rehabilitation which helps reduce the number of and limit the duration and impact of interruptions to customers. Circuits are inspected and equipment is replaced as necessary. Equipment may include, but is not limited to, poles, switches, crossarms, insulators, braces and cutouts. In 2016, Met-Ed completed the rehabilitation of one circuit, and plans to complete the rehabilitation of an additional eleven circuits in 2017.

Met-Ed continues its efforts to add remote-controlled sectionalizing devices that allow for prompt restoration during outages. Supervisory control and data acquisition ("SCADA") provides communication with circuit breakers and line switches, giving employees the ability to remotely operate the breakers or switches to reduce restoration time. In 2016, seventy SCADA switches were installed, and twenty-eight are planned in 2017.

[1] On March 30, 2015, the Commission issued an order directing Metropolitan Edison Company to prepare and file a revised implementation plan relating to specific topics addressed in the report issued by the Commission's Bureau of Audits on February 12, 2015. *Implementation Plan for the Focused Management Audit of Metropolitan Edison Company,* Docket No. D-2013-2365991.

[2] See Footnote 1.

[3] On October 19, 2015, pursuant to Section 1352 of the Pennsylvania Public Utility Code, 52 Pa. Code §§ 121.1 et seq. and the Commission's final order in Implementation of Act 11 of 2012, Metropolitan Edison Company filed a petition for approval of their LTIIP at Docket No. P-2015-2508942. On February 11, 2016 the Commission approved the plan.

Met-Ed proactively replaces porcelain cutouts with polymer cutouts. Failed porcelain cutouts ultimately cause lockouts of reclosers and circuit breakers and other equipment damage. In 2016, Met-Ed replaced 533 porcelain cutouts on six circuits and will target an additional five circuits in 2017.

The Company's Underground Residential Distribution ("URD") Cable Replacement program helps reduce the number of outages by targeting the replacement of bare concentric neutral cable, which was manufactured without an insulating jacket around the concentric neutral wires. This design often caused the cable to fail prematurely. Met-Ed replaced approximately 3,900 feet of cable in 2016 and plans to replace approximately 12,500 feet of cable in 2017.

To improve infrastructure, the Company targets the replacement of wood poles that have degraded beyond restorable condition and the reinforcement of poles that are restorable. In 2016, Met-Ed replaced or reinforced 288 wood poles and plans to replace or reinforce approximately 368 wood poles in 2017.

B. Preventative Maintenance Programs

In accordance with 52 Pa. Code § 57.198, every two years, Met-Ed files a Biennial Inspection, Maintenance, Repair and Replacement Plan[4] for approval by the Commission. This Biennial Plan is designed to reduce the risk of outages on the Company's system and form the basis for the Company's inspection and maintenance objectives. The Biennial Plan includes programs to conduct vegetation management, pole inspections, distribution overhead line inspections, distribution transformer inspections, recloser inspections and substation inspections.

These well-established maintenance programs ensure the existing system will continue to operate in a safe and reliable manner and serve to identify any potential system issues so they can be proactively addressed.

C. Capacity Planning

Due to ongoing system enhancements and the hard work of employees and contractors, Met-Ed is able to reliably serve its customers. The primary driver of customer demand this summer is again expected to be warm temperatures across the region.

Met-Ed does not foresee significant concerns with system delivery capacity during the upcoming summer based on its performance during last summer's peak. Ongoing facility enhancements designed to improve reliability, load-bearing upgrades, and customers'

[4] Pursuant to 52 Pa. Code § 57.198, every two years an electric distribution company shall file, and receive approval from the Commission of, a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. On December 30, 2013, Paul Diskin, Director, Technical Utility Services, issued a letter approving the Companies' biennial inspection, maintenance, repair, and replacement plan effective January 1, 2015 through December 31, 2016. Further, on March 4, 2016 an additional letter was issued approving the plans effective January 1, 2017 – December 31, 2018.

adoption of energy efficiency and conservation opportunities are being viewed as additional opportunities to ensure the reliability and capacity availability of the system.

D. 2016/2017 Storm Update and Lessons Learned

In calendar year 2016, Met-Ed did not experience any major events.

Throughout restoration efforts, working safely and efficiently is the main objective. Regional conference calls are held for preparation and logistics planning. Effective planning allows for the precise deployment of crews, supplies, and equipment. Employees are also staggered around the clock to maximize productivity.

After each significant storm event, Met-Ed leadership conducts post-storm review meetings to identify and disseminate lessons learned which are used to improve the emergency response plan.

E. 2017 Summer Readiness

Capacitor Inspections – By June 1, 2017, Met-Ed will have inspected all line capacitor banks and completed all necessary repairs or replacements to ensure at least 98% availability.

Mobile Substations – By June 1, 2017, Met-Ed will have completed a review of the status of its mobile substations. Included in the inspections are the mobile trailer, transformer and breaker.

Substation – By June 1, 2017, Met-Ed will have inspected all substation capacitor banks and completed necessary repairs or replacements to ensure minimum 98% available reactive support. In addition, a review of spare equipment will have been completed. Spare equipment includes voltage regulators and substation cooling items such as transformer fans.

By July 1, 2017, Met-Ed will have cleaned and inspected all transformer cooling systems. Cleaning removes the accumulation of Cottonwood seedlings that are released each May and June. In addition, fans and pumps are inspected and their functionality verified during the cleaning process.

Capacity Additions:

- **Jackson – North Hanover 115kV Line Terminal Upgrade** – This project increased line capacity by replacing the substation conductor with a higher capacity conductor and upgrading the terminal equipment. This equipment is already in service.

- **Hunterstown 230/115kV Transformer** – Met-Ed will install a second 230/115kV transformer at the Hunterstown substation, which is expected to be completed by June 1, 2017.

- **Hunterstown – Oxford 115kV Line Reconductor** – This project installed higher capacity conductor on the Hunterstown – Oxford 115kV line. This work has been completed.

Transmission Preparedness – Met-Ed conducts an annual transmission readiness review with transmission operations to discuss the capability and reliability of the system for the summer. The Company's detailed review did not reveal any significant issues for the summer of 2017. Based on the system conditions modeled, the Met-Ed transmission system is expected to sufficiently support the forecasted peak summer loading. During the system assessment, a review of the voltage stability analysis was conducted and produced acceptable power-voltage response curves.

Two aerial maintenance patrols are conducted annually in Met-Ed to inspect transmission facilities. The purpose of the routine patrols is to ensure the integrity of in-service transmission lines to maintain safe and reliable service. The first aerial patrol has been completed and the second will be completed by year end.

Additionally, PJM Interconnection LLC ("PJM") has operational procedures identified to effectively control and mitigate contingency outage conditions on the transmission system. Met-Ed has operational procedures outlined to implement any PJM required actions and to mitigate contingency conditions on the lower voltage systems (<100kV).

Emergency Exercises – As part of the FirstEnergy Utilities ("FEU") Emergency Preparedness program, Met-Ed completed emergency exercises on April 20, 2017. The exercises facilitated the testing and validation of key emergency response roles, systems and processes. The primary objective of each exercise is to ensure a complete understanding of the restoration process by all participants through exposure to a variety of real-world scenarios and decision making challenges that could be experienced during actual restoration events.

Event Preparedness – FirstEnergy's in-house meteorologists use highly sophisticated, proprietary data and forecasting models specifically designed to provide actionable intelligence. When predicted weather meets specific criteria, planning and preparation work is immediately initiated, many times days before any impact.

As part of the preparation efforts, Met-Ed's executive leadership and operations managers engage the emergency restoration process. Based on available data and collaboration within Met-Ed, resource needs are evaluated and requests are submitted as needed to the FEU Emergency Operations Center for fulfillment. These requests can include, but are not limited to: line resources (both internal to FirstEnergy and external), hazard responders, damage assessors, public protectors, vegetation crews, equipment needs, and material requirements. Depending on the predicted magnitude of the event, staging areas are pre-identified and can be quickly activated to prepare for the efficient deployment of crews and equipment.

Refresher Training – All employees with emergency response roles receive appropriate refresher training at specified intervals to ensure they are immediately deployable when an event impacts the system. Expectations for employees to complete appropriate training and

verify all equipment and personal protective equipment are available and in proper working order are communicated each year during emergency exercises and verified by Met-Ed management.

Staffing – Met-Ed is fully staffed for the 2017 summer storm season. Met-Ed performs an annual staffing analysis that accounts for attrition, including retirements, to determine the proper staffing levels of craft workers. Met-Ed then enrolls students in the Power Systems Institute ("PSI") based on the results of the analysis. PSI is a unique, two-year program that combines classroom learning with hands-on training. Met-Ed is expected to hire fifteen line worker graduates and eight substation electrician graduates in 2017.[5] The objective of the PSI program is to proactively hire a diverse group of individuals that will fulfill the line work and substation electrician staffing needs for Met-Ed. The following colleges have partnered with Met-Ed to support these line worker and substation electrician development:

- Pennsylvania Highlands Community College (for Substation students)
- Reading Area Community College (for Line and Substation students)

For larger-scale events, Met-Ed is able to supplement its own resources by accessing FirstEnergy's portfolio of operating companies that includes the additional three companies located within Pennsylvania, as well as an additional six operating companies in other jurisdictions. The consistency in standards and work practices employed across all ten of these operating companies enables streamlined resource sharing in a way that promotes both safety and efficiency.

FirstEnergy, for itself and its affiliated operating companies including Met-Ed, is a member of the following Regional Mutual Assistance Groups ("RMAGs") and can call upon them to request additional resources when needed:

- Great Lakes Mutual Assistance Group ("GLMA")
- North Atlantic Mutual Assistance Group ("NAMAG")
- Southeastern Electrical Exchange ("SEE")

A National Response Event ("NRE") can be activated by EEI member utilities when multiple RMAGs cannot adequately support the resource requirements of the requesting utilities.

F. Storm Response

Outage Restoration Strategy – Met-Ed begins preparing for potential outages long before severe weather hits. When inclement weather is forecasted, Met-Ed plans are activated to ensure an adequate number of crews are prepared to tackle the damage. Part of this preparation includes running a model that estimates the impact of an impending weather threat and calculates the expected number of customers impacted. This output, along with historical storm experience, is used to estimate the impact of the weather event so that properly scaled preparations can be made.

[5] Numbers are subject to change.

Information obtained through various tools and resources is critical to determine the type, number and location of resources needed to assure prompt restoration of service. Line personnel, damage assessors and hazard responders are integral resources in providing initial and ongoing assessments of the damage in the field. Line personnel are equipped with mobile data terminals ("MDTs") in their vehicles and enter damage information directly into the MDT. This information is immediately available for viewing in the Outage Management System ("OMS"). The OMS is the central collection point for all relevant information concerning damage reports, assessment and configuration of the electric distribution system. During emergencies that meet triggering criteria, the circuit quarantine process is used for rapid assessment of heavily damaged circuits. Additionally, there are two apps that employees can use on mobile devices to automatically enter damage information into the company's OMS. In the past, this process relied on paper maps, handwritten notes and phone calls between field responders and dispatch offices.

In response to power outages and other systems emergencies, FirstEnergy maintains a copy of its Emergency Plan for Service Restoration ("E-Plan") which provides the guidelines for all common processes and procedures for conducting emergency preparedness, response and service restoration. Further, Met-Ed is in the process of incorporating Incident Command System ("ICS") principles into its emergency response organization to adhere to the principles and high-level structure of the National Incident Management System ("NIMS") as appropriate in an electric utility environment.

Communications and Outreach – External Affairs managers establish communications with emergency management agencies, local officials, county commissioners, and legislators and their offices in advance of and throughout a storm to keep them apprised of preparation and planning efforts. Communications representatives also contact the media to enlist their help in encouraging customers to prepare for the likely storm events and provide information on who to call if they lose power. Proactive email alerts and phone messages are initiated to key stakeholders alerting them to the potential for extended power outages. These efforts and face-to-face outreach are closely aligned with the Company's service restoration efforts. The Company also provides safety messages via newspapers, radio, and online banner ads.

Met-Ed customers can stay abreast of restoration progress through a variety of means. A customer can access the Storm Restoration Process page of the Company's website to learn about the damage assessment and repair prioritization processes as well as the importance of customer calls and outage reporting during the restoration process. Customers can access the 24/7 Power Center outage map that provides county-by-county information. Through this site users can obtain the number of customers served and the number of customers out of power at the county level as well as estimated time of restoration ("ETR") information. In addition, the 24/7 Power Center outage map shows the status of crews restoring service, and informs customers when crews have been dispatched, when they are working on a repair and when additional crews or equipment are needed to complete restoration work.

Met-Ed's mobile website and mobile app allow customers to report outages and connect to the 24/7 Power Center outage map which has been optimized for mobile devices. From the mobile site, customers can view personalized outage status for an outage they have

reported. The mobile website and app, as well as the full Met-Ed website, also allow customers to register for outage-related alerts via text messages and/or email. These platforms also provide instructions to use two-way text messaging, an interactive option for customers to report outages and obtain outage updates.

Furthermore, Met-Ed uses Twitter and Facebook to share additional safety reminders, ETRs, updates on restoration efforts, explanations of the restoration process and information about the arrival of additional crews, water and ice locations, and links to other resources such as shelters.

In addition, Interactive Voice Response ("IVR") messaging is used to communicate restoration information to customers. Messaging is also relayed to customers who have called Met-Ed regarding their individual outage. Live Agent Customer Service Representatives are available and have the same information at their disposal.

For extended power outages, Communications issues regular news releases and media advisories over both traditional media channels and social media to update customers on the status of power restoration efforts, as well as provide realistic ETRs so customers can plan accordingly. Communications proactively issues safety messaging ranging from avoiding downed wires to properly hooking up and operating generators. The Company also has plans in place to provide free water and ice to customers without service. Once locations have been determined, this information is communicated to customers via the IVR, press releases, social media and the website.

Outage Restoration and Storm Response Best Practices – Met-Ed continues to review each storm event, and many of the practices adopted as mentioned above stemmed from sharing best practices with other utilities, a practice that continues today.